Print INNOVATION Asia ~ New Delhi, India

Color & Comfort

Trends in Sustainable and Innovative Packaging

May 8-9, 2019

DIC Corporation
Key Account Manager
Hayato Kashiwagi

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Agenda

- Facts and Figures
- Global Trends
- Sustainable Packaging
- Sustainable Solutions

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Plastic Recycle Rates in Europe

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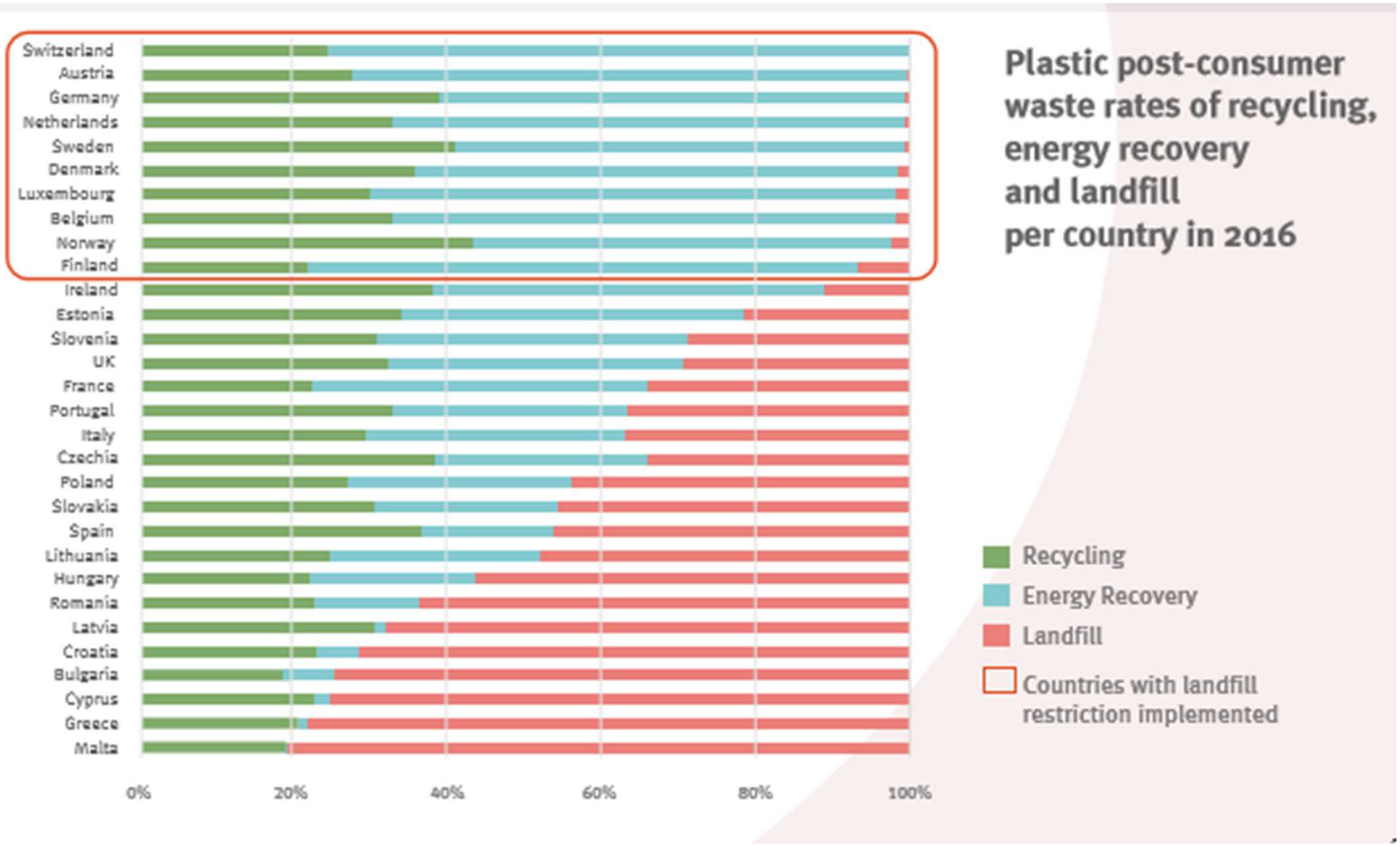
<ratio of recycle, energy recovery and landfill in 2016>



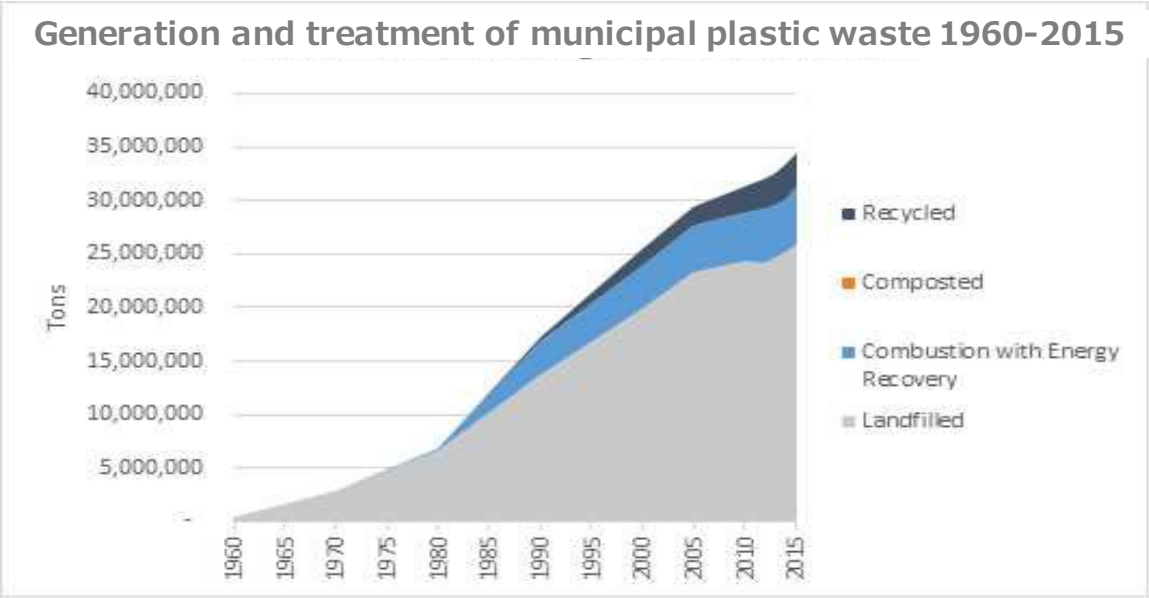
References

*Plastics - the Facts 2017, PlasticsEurope https://www.plasticseurope.org/en/resources/publications/274-plastics-facts-2017

**Ministry of Environment of Japan

***Mitsubishi Research Institute

Plastic Recycle Trends in the US



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Management Pathway	1960	1970	1980	1990	2000	2005	2010	2014	2015	
Generation	390	2,900	6,830	17,130	25,550	29,380	31,400	33,390	34,500	
Recycled	-	-	20	370	1,480	1,780	2,500	3,190	3,140	⇒（9%）
Composted	-	-	-	-	-	-	-	-	-	
Combustion with Energy Recovery	-	-	140	2,980	4,120	4,330	4,530	5,010	5,350	⇒（16%）
Landfilled	390	2,900	6,670	13,780	19,950	23,270	24,370	25,190	26,010	⇒（75%）

References

*Plastics - the Facts 2017, Plastics Europe https://www.plasticseurope.org/en/resources/publications/274-plastics-facts-2017

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Geographic differences to sustainable requirements

Sustainable requirements fundamentally differ depending on the geography of region/country.

Region	Plastic waste Emissions	Waste collection rate	Marine plastic Emissions	Material & Chemical Recycle rate	Regional Issues	Measures to be taken		
						Recovery system	Recycling materials	Biodegradable material
Japan	9.5 million tons	98%	60,000 tons	**27%**	Waste treatment capacity over (reduction of waste emissions) and reduction of CO2 emissions	-	Material and chemical recycling	Paper and biodegradable plastics
Europe	27 million tons		Unknown	**30%**				
United States	20 million tons		120,000 tons	**12%**				
Asia, Africa and other regions	**240 million tons**	**46~70%**	**5.5 million tons in China, Indonesia and the Philippines**	Unknown	Reduction of offshore plastic emissions and improvement of waste collection rate	Develop a collection system	Recycle including thermal	Paper and biodegradable plastics
Global	300 million tons		8 million tons					

GLOBAL TRENDS IN SUSTAINABILITY

～Regulations and Corporate Commitments～

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Latest announcements on plastic recycle and waste

- **EU prohibition on the use of disposable plastic products approved 24/10/18.**
  - **Complete ban on 10 items by 2021. Banned items; shopping bags, drink cups, straw, muddler, cutlery, cotton buds and balloon sticks.**
  - **Products made of oxo-degradable plastics, such as bags or packaging and fast-food containers made of expanded polystyrene also banned from 2021.**
- **Ellen MacArthur Foundation, New Plastic Economy Global Commitment – 30/10/18**
  - **290 companies and organizations including multinational companies such as Danone, H&M Group, L'Oreal, PepsiCo, Coca-Cola, Unilever and Mars, together with packing producer Amcor and plastic producer Novamont have made a commitment;**
    - **aim to eliminate problematic or unnecessary plastic packaging and move from single-use to reuse packaging models**
    - **innovate to ensure 100 percent of plastic packaging can be easily and safely reused, recycled or composed by 2025.**
    - **circulate the plastic produced by significantly increasing the amounts of plastics reused or recycled and made into new packaging or products.**

Latest trends on plastic recycle and waste

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		Industry			
		Food and home products	Electronics	Mobility	Housing-related
Regulated countries・Association		**European Commission: Reuse and recycle all containers and packaging in the EU by 2030** **Ellen MacArthur Foundation: 11 member companies declare 100% recycling of packaging by 2025** **American Chemistry Council: Recycle, reuse, and recover by 2040**	EU: WEEE Directive (Directive on Waste Electrical and Electronic Products) Japan: Promotion of material recycling for home appliances under the Home Appliance Recycling Law U.S.: No national legal system (by state)	EU, Japan: Vehicle Recycling System (EU legislation in each country under the ELV (end of life vehicle) directive) U.S.: No national legislation	EU: Waste Framework Directive Construction Recycling Law in Japan U.S.: No national legislation
Customer need		Recyclable packages	For enclosures and parts of recycled materials	Parts made from recycled materials	Parts made from recycled materials
Trends of Major Global Corporations	2020	All bottles will be recycled by 2020.	Recycling of marine plastics (packaging materials, etc.) by 2020		
	2025	All plastic packages were switched to recyclable and reusable materials by 2025.		25% or more of recycled plastic materials by 2025 Use the calendar	
	2030～	Switching to recyclable and reusable materials by 2030		Environmental Challenge 2050 (Lifecycle CO2 Emission 0: Including Recycling)	
	No maturity	Establishment of a Closed Loop Fund for the development of recyclable infrastructures	To increase the use of bio-recycled materials	Targeting a 50% reduction in CO2 emissions and a 45% reduction in resource consumption (mainly interior materials for recycling)	Start of mattress material recycling Development of recycled carpets

Most of the food and home products industry has adopted a policy of switching to either recycled, reused or recycled materials by 2025

SUSTAINABLE PACKAGING

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Printing Ink Sustainable Measures

A combination of selective environmentally friendly raw material and innovative technologies to realize sustainable packaging.

Keywords to Sustainable and Innovative Packaging

1) **Recycle** - mono-material, mono-layer, de-inking, raw material
2) **Reduction of VOC** - Waterbased, solvent free, energy curable UV/EB
3) **Carbon Neutral** – renewable material, biomass material
4) **Lightweight, decreased structure** – barrier products
5) **Extended shelf life** – barrier products
6) **Biodegradability** – biodegradable ink

	Global Sustainability Tasks				
	Global Warming	Circular Economy	Food Loss	Industrial waste Reduction	Health and Environment
Packaging Solutions	• Biomass • Light weight • Solvent free	• Biomass • Establish circular economy • Recycling	• Extended shelf life	• Establish circular economy • Biodegradable	• Solvent free

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1) Recyclability

DIC continue to pursue technology in a circular economy, both for recycling the finished packaging products, as well as utilizing recycled material as raw material.

Use of recycled material

- Recycled PET
- Recycled OPS

Assist easy recycling

- Mono-material
- Mono-layer
- De-inking

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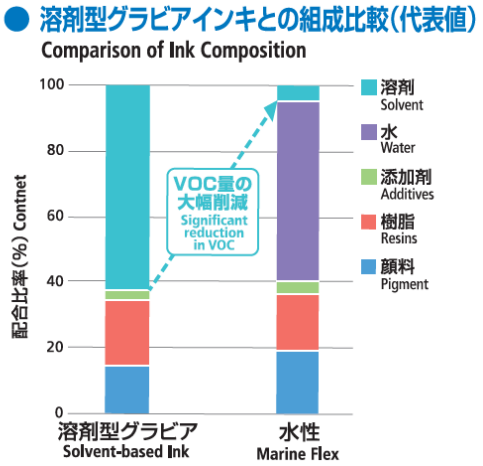
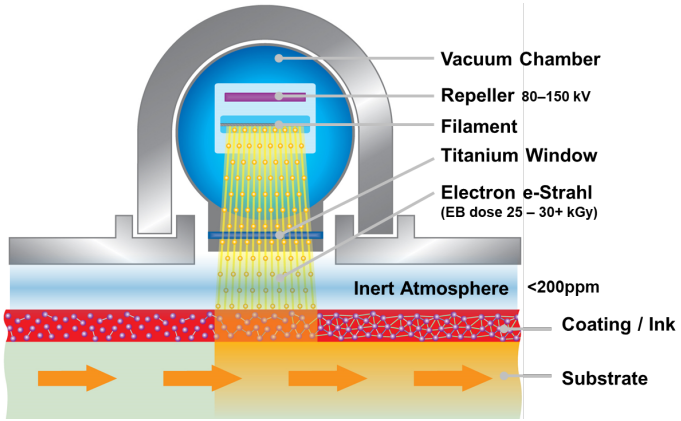
2) Reduction of VOC

The reduction of VOC's contributes to less greenhouse gasses, better working environment and the use of renewable resources.

- **Waterbased flexo and gravure**
  - Reduction of VOC's and CO2 emissions.
  - Reduced environmental costs – insurance, explosion proof, etc.
  - Improved work environment.
  - Limiting use of oil based raw material.
- **Solvent Free Adhesives**
- **Energy Curable Technology (EB)**
  - Instant cure – no dryer
  - Excellent surface resistance
  - VOC free
  - Easy press handling
  - Cold process
  - No photo initiator





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3) Carbon Neutral

The utilization of renewable resources and, establishing a CO_2 circular economy.

Resin
Rosin
NC
Vegetable oil, sugar

+

Solvent
Bioethanol
Ethyl acetate

+

Additives
Natural wax
Natural Plasticizer

+ Pigment

Biomass Ink＝inks using renewable resources as raw material

The biomass mark is issued and certified by the Japan Organics Recycling Association.

バイオマス

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4) Light weight
5) Extended shelf life

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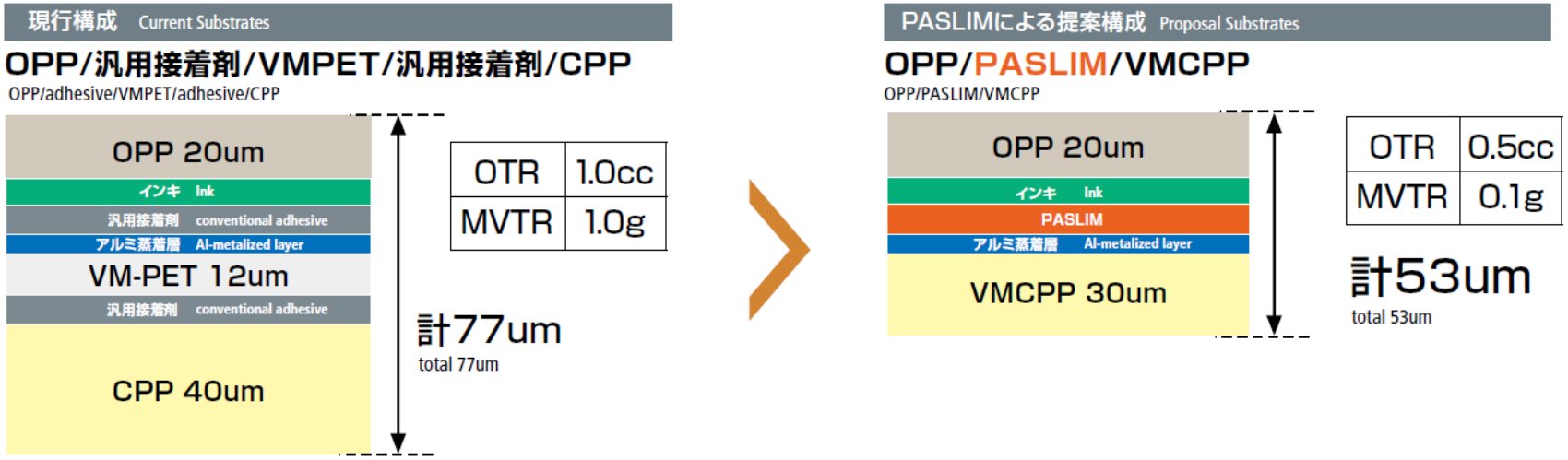
Adding or supplementing the package with barrier properties.

- Additional coating to improve the O2 barrier performance of substrates with the combination of vacuum metalized films.
- Stabilize gas barrier performance with unstable vacuum metalized barrier films.
- Allow simplification of the layer, reduction of waste volume and packaging manufacturing cost.



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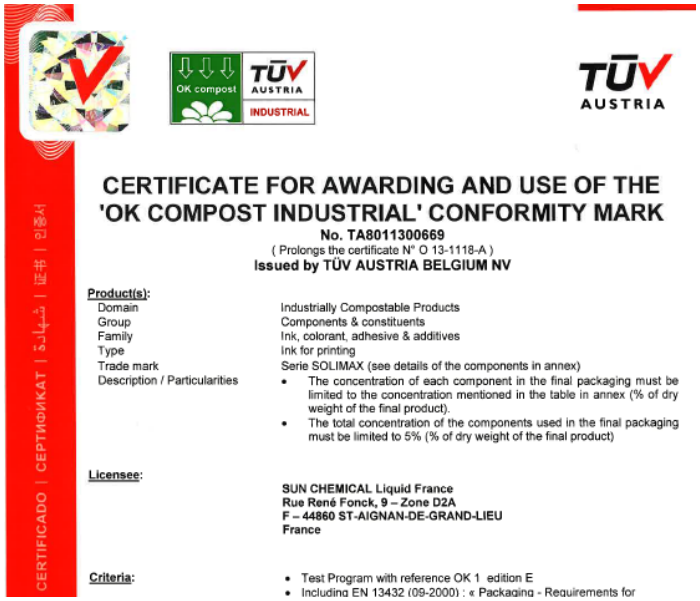
6) Biodegradability

With an increasing focus on food safety and environmental impact, DIC aims to realize a compostable package through a combination of ink and biodegradable film.

- **Certification for compost ability.**
  - **Certified by TUV Austria.**
  - **Compliance with EN13432 and EU Packaging Directive 94/62/EEC.**
  - **Multiple compostable film available in the market.**
- **Criteria for certification;**
  - **Chemical characteristics**
  - **Biodegration**
  - **Disintegration**
  - **Ecotoxicity**
  - **http://www.tuv-at.be/home/**



CERTIFICADO | СЕРТИФИКАТ | 证书 | 인증서

TÜV AUSTRIA

CERTIFICATE FOR AWARDING AND USE OF THE 'OK COMPOST INDUSTRIAL' CONFORMITY MARK

No. TA8011300669

(Prolongs the certificate N° O 13-1118-A)

Issued by TÜV AUSTRIA BELGIUM NV

Product(s):

Domain	Industrially Compostable Products
Group	Components & constituents
Family	Ink, colorant, adhesive & additives
Type	Ink for printing
Trade mark	Serie SOLIMAX (see details of the components in annex)
Description / Particularities	• The concentration of each component in the final packaging must be limited to the concentration mentioned in the table in annex (% of dry weight of the final product). • The total concentration of the components used in the final packaging must be limited to 5% (% of dry weight of the final product)

Licensee:

SUN CHEMICAL Liquid France
Rue René Fonck, 9 – Zone D2A
F – 44860 ST-AIGNAN-DE-GRAND-LIEU
France

Criteria:

- Test Program with reference OK 1 edition E
- Including EN 13432 (09-2000) : « Packaging - Requirements for

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DIC'S CORPORATE COMMITMENT

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Sustainable Development Goals

The DIC Group pledges to contribute through its business activities to the success of the SDG's.

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